

REMARKS

This reply is filed in response to the office action dated May 10, 2004. Reconsideration of the application and the claims is respectfully requested.

Claim Rejections – 35 U.S.C. §102(b), §103(a)

Claims 1-46 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as allegedly being obvious over U.S. No. Patent 4,045,359 (Fletcher et al). Claims 47 and 48 were rejected under 35 U.S.C. §103(a) as allegedly being obvious over Fletcher et al. in view of U.S. Patent No. 6,172,427 (Shinohara et al). Independent claims 1, 20, 47 and 48 are being amended in this reply. Support for the amendment can be found throughout the specification, for instance, in paragraphs 28, 35, 77, 99, and 101.

Neither Fletcher et al. nor Shinohara et al., taken together or alone, discloses every element claimed in the pending independent claims. For instance, neither Fletcher et al. nor Shinohara et al. discloses, suggests, or teaches “applying a pulse of energy in the vicinity of a reaction surface to start self-sustaining chemical reactions that create highly vibrationally excited molecules” as claimed in claim 1. Unlike the method recited in claim 1, which includes “self-sustaining chemical reactions that create highly vibrationally excited molecules” initiated by “a pulse of energy,” Fletcher et al. uses external energy, that is, laser, to create excited species (Col. 2, lines 67-68; Col. 5, lines 4-7). Fletcher et al.’s every reaction is guided and energized by at least one photon from the laser (Col. 2, lines 67-68) and thus requires external energy to sustain its reaction. Shinohara et al. does not disclose or suggest creating excited species at all.

Similarly, neither Fletcher et al. nor Shinohara et al. discloses, suggests, or teaches every element claims in claim 47. For instance, there is no teaching in either references to “initiate chemical reactions that sustain themselves until reactants of the chemicals are depleted, the chemical reactions creating highly vibrationally excited molecules” or “repeating the applying and the transferring steps wherein hot carriers are created in pulses.”

For another, in Fletcher et al. and Shinohara et al., there is no disclosure, suggestion or teaching of “transferring at least some of vibration energy of the highly

vibrationally excited molecules to carriers in a conducting surface to form hot carriers in pulses and converting energy of the hot carriers to useful work" as claimed in claims 1 or "transferring at least some of vibration energy of the highly vibrationally excited molecules to carriers in a conducting surface to form hot carriers; and converting energy of the hot carriers to useful work" as claimed in claim 47. Similarly, Fletcher et al. and Shinohara et al. do not disclose, suggest or teach a device that creates "hot electrons in pulses" and "converts kinetic energy of the hot electrons into useful work" as claimed in claims 20 and 48.

Not only does Fletcher et al. fail to disclose vibrational energy transfer to hot electron energy, but also Fletcher et al. explicitly directs the course of reactions and discards the energy as heat. In a way, it can be said that Fletcher et al. teaches away from converting energy to useful work since Fletcher et al. expressly provides that the main function of the particle is to act as an energy sink. Indeed, the main purpose of Fletcher et al.'s device is to discard the excess energy rather than collect it as useful work. Further, Shinohara et al. does not make up for what Fletcher et al. lacks.

Combining these two references without any motivation or suggestion is improper. Since Fletcher et al. teaches to discard its excess energy, there is no possible motivation or suggestion to combine its teachings with an electric energy supply system for vehicle of Shinohara et al. Likewise, there is no motivation or suggestion in Shinohara et al. to combine its teachings with an apparatus for photon excited catalysis of Fletcher et al. Accordingly, applicants respectfully submit that combining Fletcher et al. and Shinohara et al. to reject claims 47 and 48 is groundless.

For at least the foregoing reasons, claims 1, 20, 47 and 48 and their respective dependent claims are believed to be patentable.

Double Patenting

With respect to the double patenting rejections, when all other rejections are resolved, applicants will submit terminal disclaimers where needed in order to expedite the case into allowance.

All pending claims are believed to be patentable and a favorable Office Action is hereby earnestly solicited. If a telephone interview would be of assistance in advancing

prosecution of the subject application, the Examiner is requested to telephone the number provided below. Please charge any fee due associated with this reply to Deposit Account No. 02-0393.

Respectfully submitted,



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